

REMARKS

By this Amendment, Applicants have amended claims 19, 49, and 54. No new matter has been added. Claims 9-18 and 26-37 have been withdrawn from consideration as directed to claims non-elected without traverse. Thus, claims 1-8, 19-25, 38, 39, 41-58, 60, and 62-73 are pending on the merits.

I. Allowed Claims

Applicants appreciate the Examiner's continued indication that claims 1-8 are allowed. Applicants respectfully note, however, that claims 58 and 62 each depend from allowed claim 8, and that claim 63 depends from allowed claim 1. Therefore, claims 58, 62, and 63 should be allowable for at least the same reasons their corresponding independent claim is allowable. Accordingly, Applicants respectfully request reconsideration and allowance of dependent claims 58, 62, and 63.

II. Rejections under § 103(a) based on Takahashi et al. in view of Sandhu

In the Office Action, the Examiner rejected claims 19-73 under 35 U.S.C. § 103(a) as being unpatentable over Takahashi et al. (U.S. Patent No. 6,518,547) in view of Sandhu (U.S. Patent No. 6,232,580). Of the rejected claims, claims 19, 25, 43, 49, and 54 are independent claims. By this Amendment, independent claims 19, 49, and 54 have been amended, thereby obviating the rejection of those claims. To the extent, however, that the Examiner may consider asserting a rejection of amended independent claims 19, 49, and 54, and/or maintaining the current rejection of independent claims 25 and 43 based on the Examiner's proposed, hypothetical

modification of Takahashi et al.'s disclosure, Applicants respectfully submit that there is no legally valid suggestion or motivation to make such a modification to Takahashi et al.'s disclosure, and even if there was, the Examiner's proposed modification does not result in disclosure or suggestion of all of the subject matter recited in each of Applicants' independent claims 19, 25, 43, 49, and 54.

A. Lack of Legally Valid Suggestion or Motivation

Applicants respectfully traverse the Examiner's § 103(a) rejection of Applicants' independent claims 19, 25, 43, 49, and 54 because the Examiner has failed to establish a *prima facie* case of obviousness. In order to establish a *prima facie* case of obviousness, among other requirements, "there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings." M.P.E.P. § 2143. Further, "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." § 2143.01. Since making the Examiner's proposed, hypothetical modification to the Takahashi et al. reference's disclosure would change its principle of operation, there is no legally valid suggestion or motivation to make the proposed modification based on the Sandhu reference.

In the rejection statement, the Examiner concedes that the Takahashi et al. reference does not disclose "an inner surface reflecting the light generated by the illuminant extend[ing] to a backside of the illuminant with respect to the direction toward

the object, the inner surface faces the illuminant without any constituent part of the lamp therebetween, and a first cooling part and a second cooling part.” Office Action at 2-3. The Examiner asserts, however, that the Sandhu reference discloses “an inner surface (61) reflecting the light generated by the illuminant (28) extend[ing] to a backside of the illuminant with respect to the direction toward the object (column 6, lines 1-8), the inner surface faces the illuminant without any constituent part of the lamp therebetween (Figures 2-7), and a first cooling part (64) and a second cooling part (70).” Id. at 3. Thereafter, the Examiner concludes that “[i]t would have been obvious . . . to have included an inner surface reflector which extends to a backside of the illuminant as well as the first and second cooling part of Sandhu in the apparatus of Takahashi et al. because, an inner surface reflector which extends behind the illuminant redirects the light from the light sources in a downward direction and a first and second cooling part allows the inner surface and lamps to be cooled more efficiently.” Id.

Applicants respectfully disagree with the Examiner’s conclusion about the obviousness of modifying the Takahashi et al. reference such that an inner surface of the Takahashi et al. reflector extends to a backside of the illuminant at least because such a modification would change an explicitly-disclosed principle of operation of the Takahashi et al. heat treatment apparatus.

The Takahashi et al. reference discloses a substrate heat treatment apparatus 1 having an irradiation part 11 including lamps 11a through 11c, a base plate 111, and reflectors 112. Each reflector 112 has an axisymmetrical shape about a Z-axis and a cylindrical side surface, and is provided with a through hole 112a therein. The inner surface of the through hole 112a defines a gold-plated reflecting surface 112b for

reflecting the light emitted from the lamp 11a, 11b, or 11c via filament 110b. The reflecting surface 112b has a cylindrical first reflecting surface R1 on upper end and a second reflecting surface R2 connected with the lower end of the first reflecting surface R1. The second reflecting surface R2 has an inverted elliptic semispherical surface shape or an inverted parabolic semispherical surface shape. The central axes of the mounting hole 111a of the base plate 111 and the through hole 112a of the reflector 112 are substantially concentric along the Z-axis direction, and the mounting hole 111a and the through hole 112a are substantially identical in diameter to each other. The mounting hole 111a and the through hole 112a of the reflector 112 are substantially continuous with one another, thereby defining a single hole.

Referring to Figs. 4A-4E, Takahashi et al. discloses that the heating efficiency of the light reaching the area AR is excellent when the lower end of the filament 110b is located in the area between the focal point F of the reflecting surface R2 and the opening OP while the upper end of the filament 110b is located within the area of the first reflecting surface R1, and the heating efficiency of the light reaching the area AR is highest when at least the upper 1/3 of the filament 110b is located in the area closer to the first reflecting surface R1. (Col. 7, line 60, through col. 8, line 28.)

In short, the Takahashi et al. reference discloses the importance of having a portion of the filament 110b extend into the cylindrical portion R1 of the reflector 112 for achieving the highest heating efficiency. As a result, extending the reflector 112 “to a backside of the illuminant,” as asserted by the Examiner, is contrary to the Takahashi et al. reference’s explicitly-disclosed principle of operation. Furthermore, if the Takahashi et al. reflector 112 were extended “to a backside of the illuminant,” the

lamp 11 would be prevented from being mounted in the base plate 111. For at least these reasons, the Examiner's proposed, hypothetical modification to the Takahashi et al. heat treatment apparatus is contrary to explicitly-disclosed principles of Takahashi et al. As a result, there is no legally valid suggestion or motivation to make the Examiner's proposed hypothetical modification to the Takahashi et al. reference's heat treatment apparatus based on the Sandhu reference.

For at least the above-outlined reasons, the Office Action has failed to establish that any of Applicants' independent claims 19, 25, 43, 49, and 54 are *prima facie* obvious based on the Office Action's proposed combination of the Takahashi et al. and Sandhu references. Therefore, each of Applicants' independent claims 19, 25, 43, 49, and 54 are patentably distinguishable from the Takahashi et al. and Sandhu references, taken individually or in combination.

B. Failure to Disclose or Suggest All of the Subject Matter Recited

In addition to lacking any legally valid suggestion or motivation to make the Office Action's proposed, hypothetical modification to the Takahashi et al. reference, the Office Action's proposed combination of the Takahashi et al. and Sandhu references fails to result in disclosure or suggestion of all the subject matter recited in each of Applicants' independent claims 19, 25, 43, 49, and 54.

In order to establish a *prima facie* case of obviousness, in addition to requiring a legally valid suggestion or motivation, "the prior art reference (or references when combined) must teach or suggest all the claim limitations." M.P.E.P. § 2143. Because the Office Action's proposed combination of the Takahashi et al. and Sandhu references

fails to disclose or suggest all of the subject matter recited in each of Applicants' independent claims 19, 25, 43, 49, and 54, the Office Action has failed to establish that any of those claims is *prima facie* obvious based on the Takahashi et al. and Sandhu references.

1. Amended Independent Claim 19

Applicants' invention as recited in amended independent claim 19 is directed to a heating unit for heating an object to be heated. The heating unit includes a plurality of lamps used as a heat source. Each of the lamps includes an illuminant generating a light, a lamp support part supporting the lamps, and an inner surface covering the illuminant so as to reflect the light generated by the illuminant. The inner surface has a curvature so as to reflect the light generated by the illuminant in a direction toward the object, and the inner surface reflecting the light generated by the illuminant extends to a backside of the illuminant with respect to the direction toward the object.

The Takahashi et al. and the Sandhu references, taken individually or in combination, fail to disclose or suggest a plurality of lamps, wherein each of the lamps includes an illuminant generating a light, a lamp support part supporting the lamps, and an inner surface covering the illuminant so as to reflect the light generated by the illuminant. The Takahashi et al. reference discloses lamps 11a, 11b, and 11c that are separate from reflector 112. As a result, Takahashi et al. does not disclose or suggest a plurality of lamps, each of the lamps themselves including an illuminant and an inner surface covering the illuminant so as to reflect the light generated by the illuminant.

The Sandhu reference discloses light sources 28 that are separate from reflectors 60. As a result, like the Takahashi et al. reference, the Sandhu reference does not disclose or suggest a plurality of lamps, each of the lamps themselves including an illuminant and an inner surface covering the illuminant so as to reflect the light generated by the illuminant.

Since neither the Takahashi et al. nor Sandhu references discloses or suggests all of the subject matter recited in Applicants' independent claim 19, the Office Action has failed to establish that independent 19 is *prima facie* obvious based on the Office Action's proposed, hypothetical combination of the Takahashi et al. and Sandhu references.

2. Independent Claim 25

Applicants' invention as recited in independent claim 25 is directed to a heat treatment apparatus for applying a heat treatment to an object to be processed. The heat treatment apparatus includes a support member on which the object to be processed is placed, and a heating unit having a plurality of lamps located above the support member for heating the object to be processed. Each of the lamps includes an illuminant generating a light and an inner surface covering the illuminant so as to reflect the light generated by the illuminant. The inner surface has a curvature so as to reflect the light generated by the illuminant in a direction toward the object, and the inner surface reflecting the light generated by the illuminant extends to a backside of the illuminant with respect to the direction toward the object.

As outlined above with respect to amended independent claim 19, neither the Takahashi et al. reference nor Sandhu reference discloses or suggests at least a plurality of lamps, each of the lamps including an illuminant generating a light and an inner surface covering the illuminant so as to reflect the light generated by the illuminant. Therefore, for reasons at least similar to those outlined above with respect to independent claim 19, the Takahashi et al. and Sandhu references, taken individually or in combination, fail to disclose or suggest all of the subject matter recited in Applicants' independent claim 25. Therefore, the Office Action has failed to establish that independent claim 25 is *prima facie* obvious.

3. Independent Claim 43

Applicants' invention as recited in independent claim 43 is directed to a heating unit for heating an object to be heated. The heating unit includes a plurality of lamps used as a heat source, a lamp support part supporting the lamps, an illuminant generating a light, and a reflective part reflecting the light generated by the illuminant. The reflective part has a face so as to emit the light generated by the illuminant in a direction toward the object by one time reflection, and the inner surface reflecting the light generated by the illuminant extends to a backside of the illuminant with respect to the direction toward the object.

Neither the Takahashi et al. reference nor the Sandhu reference discloses or suggests at least a reflective part reflecting the light generated by the illuminant, wherein the reflective part has a face so as to emit the light generated by the illuminant in a direction toward the object by one time reflection. In particular, the Takahashi et al.

reference disclose a reflector 112 having first reflecting surfaces R1 and second reflecting surfaces R2. The first reflecting surfaces R1 are cylindrical (see col. 8, lines 64-65), and the second reflecting surfaces R2 form an elliptic or parabolic spherical surface (see col. 9, lines 23-25). The Takahashi et al. first reflecting surfaces R1 do not emit light generated by the filaments 110b in a direction toward the object by one time reflection. Furthermore, since the Takahashi et al. second reflecting surfaces R2 have an elliptic or parabolic spherical surface, the second reflecting surface does not emit light generated by the filaments 110b in a direction toward the object by one time reflection. In particular, parabolic spherical reflectors reflect light from points positioned at locations other than the focal point of the parabolic spherical shape in a direction that is not parallel to the exit of the parabolic spherical reflector. As a result, at least some of the light emitted by Takahashi et al.'s filaments 110b will not be emitted in a direction toward the object by one time reflection. Furthermore, the Sandhu reference, like Takahashi et al., discloses parabolic reflectors 60 (see col. 6, lines 3-5). Therefore, for reasons at least similar to those outlined with respect to the Takahashi et al. reference, the Sandhu reference does not disclose or suggest a reflective part reflecting the light generated by the illuminant, wherein the reflective part has a face so as to emit the light generated by the illuminant in a direction toward the object by one time reflection.

For at least the reasons outlined above, the Takahashi et al. and Sandhu references, taken individually or in combination, do not disclose or suggest all of the subject matter recited in independent claim 43. For at least this reason, the Office Action has failed to establish that Applicants' independent claim 43 is *prima facie* obvious. Therefore, independent claim 43 should be allowable.

4. Amended Independent Claim 49

Applicants' invention as recited in amended independent claim 49 is directed to a heat treatment apparatus for applying a heat treatment to an object to be processed. The heat treatment apparatus includes a support member on which the object to be processed is placed, a heating unit having a plurality of lamps located above the support member for heating the object to be processed. Each of the lamps includes an illuminant generating a light, a reflective part reflecting the light generated by the illuminant, and a projection face facing the illuminant so as to project the light emitted from the illuminant and the light reflected by the reflective part. The reflective part has a face so as to emit the light generated by the illuminant toward the object by one time reflection, and the reflective part extends to a backside of the illuminant opposite to the projection face.

For at least reasons similar to those outlined above with respect to independent claims 19, 25, and 43, the Takahashi et al. and Sandhu references, taken individually or in combination, fail to disclose or suggest all of the subject matter recited in Applicants' amended independent 49. Therefore, the Office Action has failed to establish that independent claim 49 is *prima facie* obvious.

5. Amended Independent Claim 54

Applicants' invention as recited in amended independent claim 54 is directed to a heating unit for heating an object to be heated. The heating unit includes a plurality of lamps used as a heat source. Each of the lamps has a light-emitting part, a lamp

support part supporting the lamps, and an electrode part configured and arranged to be supplied with an electric power and connected to the light-emitting part via a middle part located between the light-emitting part and the electrode part. The light-emitting part includes an illuminant generating a light, and the illuminant is connected to the electrode part. A reflective part has a face so as to emit the light generated by the illuminant substantially in the same direction by one time reflection. The projection face faces the illuminant so as to project the light emitted from the illuminant and the light reflected by the reflective part toward the object, and the reflective part extends to a backside of the illuminant opposite to the projection face.

For at least reasons similar to those outlined above with respect to independent claims 19, 25, and 43, the Takahashi et al. and Sandhu references, taken individually or in combination, fail to disclose or suggest all of the subject matter recited in Applicants' amended independent claim 54. Therefore, the Office Action has failed to establish that independent claim 54 is *prima facie* obvious.

III. Conclusion

Applicants respectfully submit that independent claims 1, 8, 19, 25, 43, 49, and 54 are allowable. The Examiner has allowed independent claims 1 and 8, and independent claims 19, 25, 43, 49, and 54 should be allowable for at least the reasons outlined previously herein. Furthermore, Applicants respectfully submit that claims 2-7, 20-24, 38, 39, 41, 42, 44-48, 50-53, 55-58, 60, and 62-73 are allowable by virtue of their dependency on their corresponding independent claims 1, 8, 19, 25, 43, 49, and 54, as

well by their additional recitations of novel and non-obvious subject matter. Therefore claims 1-8, 19-25, 38, 39, 41-58, 60, and 62-73 should be allowable.

Applicants respectfully request reconsideration and reexamination of this application, and timely allowance of all of the pending claims.

If the Examiner believes that a telephone conversation might advance prosecution, the Examiner is cordially invited to call Applicants' attorney at (571) 203-2739.

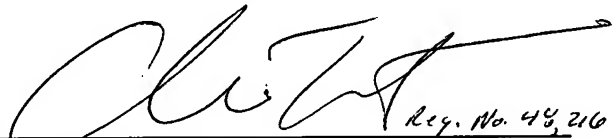
Applicants respectfully submit that the Office Action contains numerous assertions concerning the related art and the claims. Regardless of whether those assertions are specifically addressed herein, Applicants decline to automatically subscribe to them.

Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

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By:  *Reg. No. 48,216*
David W. Hill
Reg. No. 28,220